WHAT IS CLAIMED IS:

1. An ultrasound diagnosis apparatus comprising:

an ultrasound probe which includes ultrasound transducers which transmit and receive ultrasound waves to and from an object to be examined;

an ultrasound transmission/reception unit which transmits and receives an ultrasound beam by driving the ultrasound transducers;

a physiological characteristic the object image data generating unit which generates physiological characteristic image data corresponding to at least one time phase, which is used to image at least one physiological characteristic of the object, on the basis of a reception signal received by the ultrasound transmission/reception unit;

a memory which stores the physiological characteristic image data;

an LOI (Line Of Interest) setting unit which sets an LOI at an arbitrary position on a physiological characteristic image displayed on the basis of the physiological characteristic image data;

an M-mode image generating unit which reads out the physiological characteristic image data corresponding to the LOI from the memory and generates an arbitrary M-mode image as an M-mode image representing a temporal change associated with the LOI;

a setting unit which sets a profile position by

using a cursor displayed on the arbitrary M-mode image;

a profile generating unit which generates a temporal profile of the arbitrary M-mode image at the profile position and a spatial profile of the arbitrary

5   M-mode image which is associated with a line segment including at least the LOI; and

a display unit which simultaneously displays the arbitrary M-mode image, the temporal profile, and the spatial profile.

10   2.   An apparatus according to claim 1, wherein the cursor comprises a cross cursor which is constituted by a first straight line and a second straight line crossing the first straight line at a right angle, with the respective straight lines and an

15   intersection point thereof moving on the arbitrary M-mode image in accordance with an instruction from an operator, and

the profile generating unit generates the temporal profile corresponding to a position of the first

20   straight line, and generates the spatial profile corresponding to a position of the second straight line.

3.   An apparatus according to claim 1, wherein the display unit places the temporal profile on the lower

25   or upper side of the arbitrary M-mode image, and places the spatial profile on the right or left side of the arbitrary M-mode image.

4. An apparatus according to claim 1, wherein the display unit displays the ultrasound image, on which at least one of an LOI set on the physiological characteristic image and the profile position is identified, simultaneously with the arbitrary M-mode image, the temporal profile, and the spatial profile.

5. An apparatus according to claim 4, wherein the display unit displays a time phase of the ultrasound image and a time phase of the temporal profile in correspondence with each other.

6. An apparatus according to claim 4, wherein when a length of an LOI set on the ultrasound image changes over time, the display unit performs display upon controlling at least a length of an M-mode display axis corresponding to the LOI length to be constant.

7. An apparatus according to claim 1, wherein the physiological characteristic includes one of a strain amount of tissue, a strain ratio of tissue, a movement amount of the tissue, a movement velocity of at least one of the tissue or blood, and a correlation amount of the reception signal power.

8. An apparatus according to claim 1, wherein when the physiological characteristic image data includes at least two physiological characteristics, the M-mode image generating unit generates the arbitrary M-mode image associated with a designated one of the physiological characteristics.

9. An ultrasound diagnosis apparatus comprising:

an ultrasound probe which includes ultrasound transducers which transmit and receive ultrasound waves to and from an object to be examined;

an ultrasound transmission/reception unit which transmits and receives an ultrasound beam by driving the ultrasound transducers;

a physiological characteristic image data generating unit which generates physiological characteristic image data corresponding to a plurality of time phases, which are used to image a physiological characteristic associated with a body of the object, on the basis of a reception signal received by the ultrasound transmission/reception unit;

a memory which stores the physiological characteristic image data;

an LOI setting unit which sets an LOI at an arbitrary position on a physiological characteristic image displayed on the basis of the physiological characteristic image data;

an M-mode image generating unit which reads out the physiological characteristic image data corresponding to the LOI from the memory and generates an arbitrary M-mode image which is an M-mode image indicating a temporal change associated with the LOI;

a setting unit which sets a specific region whose motion is to be tracked in a time-series manner and a

start time phase of tracking;

a specific region tracking unit which tracks a time-series position of the specific region from the start time phase by using the physiological characteristic image data corresponding to said plurality of time phases and acquires a tracking line associated with the specific region;

a profile generating unit which generates a temporal profile of the arbitrary M-mode image associated with the tracking line; and

a display unit which simultaneously displays the arbitrary M-mode image and the temporal profile.

10. An apparatus according to claim 9, wherein the physiological characteristic image data comprises at least a movement velocity of tissue.

11. An apparatus according to claim 10, wherein the specific region tracking unit performs an angle correction for the movement velocity of the tissue in consideration of a direction of the LOI and the ultrasound transmission/reception direction, and obtains a tracking line for a specific region on the basis of a velocity component in the corrected predetermined motion direction.

12. An apparatus according to claim 9, wherein the display unit displays the tracking line on the arbitrary M-mode image.

13. An apparatus according to claim 9, wherein the

display unit simultaneously displays the LOI and the
ultrasound image for recognizing at least one of the
specific regions, together with the arbitrary M-mode
image and the temporal profile.

5   14. An apparatus according to claim 13, wherein
the display unit displays a time phase of the
ultrasound image and a time phase of the temporal
profile in correspondence with each other.

15. An apparatus according to claim 9, wherein
10   the profile generating unit further generates a
spatial profile of the arbitrary M-mode image
associated with a line segment containing at least the
LOI, and

the display unit simultaneously displays the
15   arbitrary M-mode image, the temporal profile, and the
spatial profile.

16. An apparatus according to claim 15, wherein
the cursor moves on the arbitrary M-mode image
displayed in accordance with an instruction from the
20   operator, and comprises a first straight line and a
second straight line crossing the first straight line
at a right angle, and

the profile generating unit generates the temporal
profile corresponding to a position of the first
25   straight line, and generates the spatial profile
corresponding to a position of the second straight
line.

17. An apparatus according to claim 15, wherein the display unit displays a marker at a position on the temporal profile which corresponds to the second straight line on the arbitrary M-mode image.

18. An apparatus according to claim 9, wherein the display unit displays the temporal profile on the lower or upper side of the arbitrary M-mode image.

19. An apparatus according to claim 9, wherein the display unit makes a display size of the temporal profile substantially coincide with a display size of the arbitrary M-mode image.

20. An apparatus according to claim 9, which further comprises a selection unit which selects at least one physiological characteristic of a strain amount of a tissue, a movement amount of the tissue, a movement velocity of the tissue, and a luminance, and

in which the physiological characteristic includes one of a strain amount of tissue, a strain ratio of tissue, a movement amount of the tissue, a movement velocity of at least one of the tissue or blood, and a correlation amount of the reception signal power.

21. An apparatus according to claim 9, which further comprises a selection unit which selects one of physiological characteristics when the physiological characteristic image data includes at least two physiological characteristics, and

in which the M-mode image generating unit

generates the arbitrary M-mode image associated with the selected physiological characteristic.

22. An apparatus according to claim 9, which further comprises a biometric signal measuring unit which measures a biometric signal waveform associated with the object, and

in which the display unit performs display upon making a display size of a time axis of the biometric signal waveform substantially coincide with a size of a time axis of the arbitrary M-mode image.

23. An apparatus according to claim 9, wherein the M-more image generating unit calculates an average value of a plurality of physiological characteristics associated with an area adjacent to the LOI, and generates arbitrary M-mode image data of the specific region on the basis of the average value.

24. An ultrasound image display apparatus comprising:

a memory which stores physiological characteristic image data corresponding to at least one time phase, which is obtained by imaging at least one physiological characteristic of an object to be examined, on the basis of an ultrasound signal received from the object;

an LOI (Line Of Interest) setting unit which sets an LOI at an arbitrary position on a physiological characteristic image displayed on the basis of the physiological characteristic image data;

an M-mode image generating unit which reads out the physiological characteristic image data corresponding to the LOI from the memory, and generates an arbitrary M-mode image which is an M-mode image

5 representing a temporal change associated with the LOI;

a setting unit which sets a profile position by a cursor displayed on the arbitrary M-mode image;

a profile generating unit which generates a temporal profile of the arbitrary M-mode image at the

10 profile position and a spatial profile of the arbitrary M-mode image associated with a line segment containing at least the LOI; and

a display unit which simultaneously displays the arbitrary M-mode image, the temporal profile, and the

15 spatial profile.

25. An ultrasound image display apparatus comprising:

a memory which stores physiological characteristic image data corresponding to at least one time phase,

20 which is obtained by imaging at least one physiological characteristic of an object to be examined on the basis of an ultrasound signal received from the object;

an LOI (Line of Interest) setting unit which sets an LOI at an arbitrary position on a physiological

25 characteristic image displayed on the basis of the physiological characteristic image data;

an M-mode image generating unit which reads out

the physiological characteristic image data corresponding to the LOI from the memory, and generates an arbitrary M-mode image which is an M-mode image representing a temporal change associated with the LOI;

5   a setting unit which sets a specific region whose motion is to be tracked in a time-series manner and a start time phase of tracking by a cursor displayed on the arbitrary M-mode image;

          a specific region tracking unit which tracks a
10   time-series position of the specific region from the start time phase by using the physiological charac- teristic image data corresponding to said plurality of time phases and acquires a tracking line associated with the specific region;

15   a profile generating unit which generates a temporal profile of the arbitrary M-mode image associated with the tracking line; and

          a display unit which simultaneously displays the arbitrary M-mode image and the temporal profile.

20   26. An ultrasound image display method comprising:

          storing physiological characteristic image data corresponding to at least one time phase, which is obtained by imaging at least one physiological characteristic of an object to be examined on the basis
25   of an ultrasound signal received from the object;

          setting an LOI (Line Of Interest) at an arbitrary position on a physiological characteristic image

displayed on the basis of the physiological
characteristic image data;

reading out the physiological characteristic image
data corresponding to the LOI from the memory, and
5   generating an arbitrary M-mode image which is an M-mode
image representing a temporal change associated with
the LOI;

setting a profile position by a cursor displayed
on the arbitrary M-mode image;
10   generating a temporal profile of the arbitrary
M-mode image at the profile position and a spatial
profile of the arbitrary M-mode image associated with a
line segment containing at least the LOI; and

simultaneously displaying the arbitrary M-mode
15   image, the temporal profile, and the spatial profile.

27.   An ultrasound image display method comprising:

storing physiological characteristic image data
corresponding to at least one time phase, which is
obtained by imaging at least one physiological
20   characteristic of an object to be examined on the basis
of an ultrasound signal received from the object;

setting an LOI (Line Of Interest) at an arbitrary
position on a physiological characteristic image
displayed on the basis of the physiological charac-
25   teristic image data;

reading out the physiological characteristic image
data corresponding to the LOI from the memory, and

generating an arbitrary M-mode image which is an M-mode
image representing a temporal change associated with
the LOI;

5   setting a specific region whose motion is to be
tracked in a time-series manner and a start time phase
of tracking by a cursor displayed on the arbitrary
M-mode image;

tracking a time-series position of the specific
region from the start time phase by using the
10   physiological characteristic image data corresponding
to said plurality of time phases and acquiring a
tracking line associated with the specific region;

generating a temporal profile of the arbitrary
M-mode image associated with the tracking line; and
15   simultaneously displaying the arbitrary M-mode
image and the temporal profile.

28. An ultrasound image display apparatus
comprising:

a memory which stores physiological characteristic
20   image data corresponding to at least one time phase,
which is obtained by imaging at least one physiological
characteristic of an object to be examined on the basis
of an ultrasound signal received from the object;

an LOI (Line Of Interest) setting unit which sets
25   a plurality of LOIs at arbitrary different positions on
a physiological characteristic image displayed on the
basis of the physiological characteristic image data;

an M-mode image generating unit which reads out
the physiological characteristic image data
corresponding to the respective LOIs from the memory,
and generates a plurality of arbitrary M-mode images
5   which are M-mode images representing temporal changes
associated with the respective LOIs;

a setting unit which sets a profile position for
said each arbitrary mode image by cursors displayed on
the respective arbitrary M-mode images;

10   a profile generating unit which generates, for
said each arbitrary mode image, a temporal profile of
the arbitrary M-mode image at the profile position and
a spatial profile of the arbitrary M-mode image
associated with a line segment containing at least the
15   LOI; and

a display unit which simultaneously displays the
respective arbitrary M-mode images, the respective
temporal profiles, and the respective spatial profiles.

29.   An ultrasound image display apparatus
20   comprising:

a memory which stores physiological characteristic
image data corresponding to at least one time phase,
which is obtained by imaging at least one physiological
characteristic of an object to be examined on the basis
25   of an ultrasound signal received from the object;

an LOI (Line Of Interest) setting unit which sets
a plurality of LOIs at arbitrary different positions on

a physiological characteristic image displayed on the basis of the physiological characteristic image data;

an M-mode image generating unit which reads out the physiological characteristic image data corresponding to the respective LOIs from the memory, and generates a plurality of arbitrary M-mode images which are M-mode images representing temporal changes associated with the respective LOIs;

a setting unit which sets, for said each arbitrary mode image, a specific region whose motion is to be tracked in a time-series manner and a start time phase of tracking by a cursor displayed on said each arbitrary M-mode image;

a specific region tracking unit which tracks a time-series position of the specific region from the start time phase by using the physiological characteristic image data corresponding to said plurality of time phases and acquires a tracking line associated with the specific region for said each arbitrary M-mode image;

a profile generating unit which generates a temporal profile of the arbitrary M-mode image associated with the tracking line for said each arbitrary M-mode image; and

a display unit which simultaneously displays the respective arbitrary M-mode images and the respective temporal profiles.